



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/687,431	10/16/2003	Dale W. Schroeder	10030185-1	8035
57299 7590 11/13/2009				
Kathy Manke Avago Technologies Limited 4380 Ziegler Road Fort Collins, CO 80525			EXAMINER LIANG, REGINA	
			ART UNIT 2629	PAPER NUMBER
			NOTIFICATION DATE 11/13/2009	DELIVERY MODE ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

avagoip@system.foundationip.com  
kathy.manke@avagotech.com  
scott.weitzel@avagotech.com

UNITED STATES PATENT AND TRADEMARK OFFICE

---

BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

---

*Ex parte* DALE W. SCHROEDER,  
MARSHALL T. DEPUE, RAMAKRISHNA KAKARALA,  
TONG XIE, and GREGORY D. VANWIGGEREN

---

Appeal 2009-003096  
Application 10/687,431  
Technology Center 2600

---

Decided: November 10, 2009

---

Before KENNETH W. HAIRSTON, JOHN A. JEFFERY, and  
CARL W. WHITEHEAD, Jr., *Administrative Patent Judges*.  
HAIRSTON, *Administrative Patent Judge*.

DECISION ON APPEAL

This is an appeal under 35 U.S.C. §§ 6(b) and 134 from the final rejection of claims 21 to 50.<sup>1</sup> We will reverse.

---

<sup>1</sup> Claims 1 to 20 have been canceled.

The disclosed invention relates to a method and device for optically tracking motion across a surface by creating an interference pattern (i.e., a speckle) by reflecting light from the surface (Figs. 1 and 7; Spec. ¶¶ [0001]-[0003]; Abstract). The interference pattern is detected by a plurality of sensors arranged in a sensor cluster to generate first and second signals representative of the speckles to determine distance (claims 21 and 34; Spec. ¶¶ [0004], [0014]-[0018], [0020]-[0024]).

Claim 34 is representative of the claims on appeal, and it reads as follows:

34. A device for determining a first distance along a movement path on a surface over which an optical tracking device is moved by a user, comprising:

a coherent light source configured to project a first coherent light beam along the movement path and onto the surface as an incident light beam, the coherent light source being configured in respect of the surface to produce a plurality of light interference speckles resulting from the first light beam and a second light representing at least portions of the first light beam reflected from the surface interfering with one another, the speckles having a first average spatial dimension;

a plurality of light sensors arranged in a sensor cluster and operatively associated with the coherent light source and the processor, each of the plurality of light sensors having a second spatial dimension that is less than the first average spatial dimension of the speckles, each of the light sensors further being configured to generate a first signal when one of the plurality of speckles is detected thereby and to generate a second signal when one of the plurality of speckles is not detected thereby, and

a processor configured to determine the first distance on the basis of the plurality of first and second signals generated by the plurality of light sensors as the device is moved over the surface.

The prior art relied upon by the Examiner in rejecting the claims on appeal is:

Victor	US 4,751,380	Jun. 14, 1988
Jackson	US 4,794,384	Dec. 27, 1988

The Examiner rejected claims 21 to 50 under 35 U.S.C. § 103(a) based upon the teachings of Jackson and Victor.

Jackson describes a system in which an optical mouse 10 (Fig. 1) or 20 (Fig. 2) generates and detects speckles and detects movement based on the observation of changes in the speckle pattern (Abstract; col. 2, l. 37 to col. 4, l. 29; col. 4, l. 63 to col. 5, l. 17; col. 5, l. 64 to col. 6, l. 38; col. 7, ll. 53-60; col. 8, l. 51 to col. 9, l. 31). Jackson employs a detector array 16 to sense changes in the speckle pattern by “determin[ing] the number of detector cells in the array that have detected light features” (col. 3, ll. 23-25), then comparing that number to a predetermined value to determine sample validity and relative motion (col. 3, ll. 5-29; col. 7, ll. 53-59; col. 8, ll. 62-67; col. 9, ll. 1-12). Jackson compares instantaneously-determined speckle patterns with later determined valid sampled speckle patterns to determine motion (col. 7, ll. 53-59), and the speckle pattern used to determine motion moves *with* the mouse (*see* col. 5, l. 68 to col. 6, l. 7). In other words, Jackson relies upon the speckle pattern itself to determine movement. Such an optical mouse is capable of working on smooth surfaces, i.e., “[t]he reflecting surface need not be a patterned surface in the sense of the specially prepared patterns required in the optical mice of [referenced prior art] patents” (col. 3, l. 67 to col. 4, l. 2).

Victor describes a three-by-three detector array 35 that allows an optical mouse (Fig. 1) to detect light emitted from LED 15 and reflected from surface 13 and determine relative motion of the mouse as it moves over a surface having a grid pattern (Abstract; col. 3, l. 18 to col. 4, l. 34). As seen from Figure 1, the optical mouse of Victor depends upon a grid pattern 16 or 18 (see Fig. 1a) in surface 13 to detect movement across uniformly spaced vertical grid lines 41/43 and horizontal grid lines 37/39 (col. 3, l. 67 to col. 4, l. 14; col. 5, ll. 49-55; Fig. 4). As the sensor array 35 detects movement across the grid patterns 16 or 18, signals are generated which are used to determine relative motion (col. 7, l. 66-68; col. 8, ll. 55-66). Thus, for Victor, the presence of a grid pattern on the surface over which the mouse moves is crucial to the operation of the mouse and for making a relative motion determination. Stated another way, Victor needs the grid pattern in order to operate properly. The grid pattern is stationary and does not move with the mouse.

The Examiner acknowledges (Ans. 3-4) that “Jackson does not disclose the plurality of light sensor[s][sic] arranged in a sensor cluster,” nor does Jackson generate “a first signal when one of the plurality of speckles is detected” and “a second signal when one of the plurality of speckles is not detected” to determine the distance as the device is moved over a surface. According to the Examiner (Ans. 4), Victor teaches a sensor cluster (three-by-three detector array 35 in Fig. 3) where each sensor in the cluster is configured to generate the first and second signals as recited in claim 34, and a processor for determining the distance based on the first and second signals. The Examiner contends (Ans. 4) that it would have been obvious to

one of ordinary skill in the art “to modify the optical device of Jackson to have the light sensors arranged in a sensor cluster and the processor as taught by Victor so as to provide a compact optical mouse due to the use of a three-by-three detector array, and the system reliably determines relative motion between the mouse and the surface (col. 8, line[s][sic] 55-67 of Victor).”

Appellants argue *inter alia* (App. Br. 5) that the skilled artisan would not have made the modification suggested by the Examiner because Jackson uses a large detector array to detect speckles and compare array values stored in a register with array values taken at an earlier or later time, while Victor seeks to detect relation motion by sensing grid lines in a grid pattern (Reply Br. 51). Indeed, Victor requires a grid for operation, while Jackson operates only on light interference patterns. Appellants’ contention (Reply Br. 54) that there is no basis for modifying the teachings of Jackson with those of Victor to arrive at the invention of claims 21 to 50 is thus convincing.

As indicated *supra*, Jackson uses speckles to determine movement. Victor uses a sensor cluster to generate signals used to calculate movement, but requires the use of a fixed grid pattern to determine movement. Inasmuch as the system in Jackson relies on only the reflected light and snapshots of speckle (i.e., interference) patterns taken at different times, Jackson does not have any need of a grid pattern as taught by Victor. Accordingly, Appellants’ contention (Reply Br. 57) that Jackson and Victor represent “fundamentally incompatible techniques and technologies” is persuasive. We agree with Appellants that “[e]ither the navigation

techniques of Victor, or the navigation techniques of Jackson, *but not both*, would be employed by one of ordinary skill in the art” (Reply Br. 58 (emphasis added)).

Notably, the portion of Victor (col. 8, ll. 55 to 67) relied upon by the Examiner (*see* Ans. 4) as providing the motivation for modifying Jackson describes detecting motion when a detector cell “crosses grid lines during motion of the mouse over the grid” (col. 8, ll. 57-58). Thus, the portion of Victor cited by the Examiner discusses the need for a grid pattern to determine movement, and does not promote the proposed combination with the speckle and time-based detection of Jackson.

Although Victor uses a sensor cluster to determine directional movement, he specifically seeks to avoid the use of speckles due to light interference. As noted, Victor uses a grid and gridlines. Thus, we agree with the Appellants’ arguments (Reply Br. 52-58) that the skilled artisan would not have combined the teachings of the applied references to arrive at the claimed invention. In summary, the obviousness rejection of claims 21 to 50 is reversed because the Examiner’s articulated reasons for combining the teachings of the references to Jackson and Victor do not support a legal conclusion of obviousness. *See KSR Int’l Co. v. Teleflex, Inc.*, 550 U.S. 398, 418 (2007).

The decision of the Examiner is reversed.

REVERSED

Appeal 2009-003096  
Application 10/687,431

KIS

KATHY MANKE  
AVAGO TECHNOLOGIES LIMITED  
4380 ZIEGLER ROAD  
FORT COLLINS, CO 80525